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LAND UTILIZATION—DISCUSSION

RICHARD T. ELY.—The problem of finding suitable occupations and means of livelihood for returning soldiers and sailors is going to be a pressing question in the near future. At the close of the war this problem will at once become acute and will involve finding means of taking care, not only of the millions of soldiers and sailors, but also of workers in munition factories and others whose occupations have been diverted from their normal course. The land question has come to the front during or after every war in which our country has been engaged.

The reasons are obvious. Men are dislocated and the question of an occupation is reopened. Many after a life in the open look with disfavor upon the narrow confining life of a shop or store. They desire the independence of the farmer. They feel that perhaps they will have lost some advantages of advancement in their old occupations. Inquiries among Australian soldiers revealed the fact that 40,000 desired to get on the land.

Our allies are already making large, liberal, and well thought out plans to take care of returning sailors and soldiers on the land.

We should at once begin investigations with a view to making the best possible plans for taking care of soldiers and sailors who desire to get on the land. The method of simply allotting land and letting the settlers shift for themselves never worked very well, and it is now out of date either for public or private colonization of the land. People demand something better, and we are likely to have dangerous discontent as well as unemployment unless we make wise plans for demobilization. There should be no painful contrasts between what other countries and our own do for the returning men, who have risked life and limb for the defense of freedom and civilization.

It is to be noted that the insurance and compensation scheme for soldiers and sailors, already in force, lends itself to wise plans of settlement. It provides certain funds and especially contemplates the education of the returning soldiers and sailors to enable them to gain a livelihood.

We should put the soldier and sailor, who wish it, on well selected land, stand behind them with efficient guidance and capital, and afford them sufficient time for repayment for land and equipment on the amortization plan. We have already seen examples of private and successful colonization where the land purchaser has all these aids and is very generally successful.

We have a large part of the machinery and facilities required for

successful settlement of the land. We have to begin with the United States Department of Agriculture, particularly the Office of Farm Management, the work of which has just been presented to us by Professor W. J. Spillman. This office, as we have learned, has been engaged in studying problems of land tenure and land settlement for several years, has a vast amount of material available relating to this problem, and is in position to render valuable aid. We have also the Forest Service, the Reclamation Service, and other federal bureaus. We have in addition the departments of agricultural and general economics in our state universities. The immediate step is to utilize these existing agencies, in so far as possible, in investigating this problem, under competent direction.

It is highly important that this subject should be investigated immediately and at least a provisional report made on this war policy.

The purpose of the proposed investigation is to supply a basis for formulating a plan for the settlement on the land of returned soldiers and sailors of this war. A preliminary report is to be prepared after consultation, at the earliest possible date, of the various departments at Washington, the deans of agricultural colleges, commissioners of agriculture of the several states, economists who have specialized in the study of land problems, and other persons.

The proposed subjects of the investigation are:

1. General plans of land settlement and colonization in foreign countries prior to the war, and proposed adaptation of these plans for the benefit of returned soldiers and sailors.

2. Plans of land settlement and colonization in the United States which have proved successful or unsuccessful, with an analysis of the causes of success or failure, and also measures that have already been taken or are proposed by public or private agencies with reference to the settlement on the land of the soldiers and sailors returning from this war.

3. Machinery already available within the federal government and the states which might be used to facilitate the work of settling soldiers and sailors on the land; also what extension of these facilities or creation of new facilities may be desirable.

4. Land that is available or could be made available for the settlement of soldiers and sailors.

EXHIBIT A.—Our Experience with Land Benefits to Soldiers

The practice of bestowing public lands upon soldiers for their services seems to be as old as history. The early colonies adopted the practice as a means of rewarding those serving in Indian and inter-

colonial wars. The Royal Proclamation of 1763 granted to those serving in the French wars the following amounts of land: to field officers, 5000 acres; to captains, 3000 acres; to non-commissioned officers, 300 acres; to privates, 50 acres.

The Continental Congress adopted the same practice, and in 1776 provided that all officers and men serving throughout the Revolution should have grants of land ranging from 500 acres to colonels to 100 acres to privates. Of the individual colonies, Virginia, New York, Pennsylvania, North Carolina, and Georgia offered similar bounties, but in much larger amounts, for example, from 600 acres up in New York.

The colonies redeemed their pledges early by setting aside military reserves in their western lands, but disputes over the national domain kept the national government from taking complete action till 1796, when a military reserve was set aside in Ohio. In 1788, the soldiers' warrants for land had been made transferable. The act of 1796 required that the warrants should be located by January 1, 1800, but this date was subsequently extended until finally all limit as to date was removed. Accordingly it is still possible to locate land under soldiers' warrants in the public domain.

During the War of 1812, and again during the Mexican War, similar provisions were made for soldiers' services. The Act of 1846 probably represents the results of the accumulated experiences of the nation in granting public land to soldiers. The warrants were unassignable, but could be commuted. No time limit was set as to their location, and they could be located anywhere in the public domain.

Between 1850 and 1857 acts were passed which greatly extended the offers of bounties, until finally all persons serving in any war for fourteen days or over, or in any battle, in any military capacity whatever, whether as sailor, soldier, chaplain, or teamster, were awarded upon demand 160 acres of the public domain. The increasing liberality of the government was probably due to the fact that Senator Benton had about convinced the nation that any settler who developed a farm in the wilderness paid well for it, and that a land grant was no gift at all. At any rate Congress passed the Homestead Act in 1862, opening up the public lands to everybody, soldier or citizen, upon condition of residence and development. Since that time it has, of course, not been possible to use public lands as rewards for soldiers' service, except that the Homestead Act has been modified in behalf of the Civil War veterans so as to allow them to substitute their time of service in the army for residence time on their homesteads.

In all 598,360 soldier warrants were issued by the national government up to June 30, 1907, and these provided for locating 68,740,110 acres of land.

The government's reason at first for offering land bounties was to encourage enlistment. From 1850 on, however, the purpose of the bounties was to reward services.

The following may serve as a summary of the national experience with land bounties to soldiers:

1. A majority of the soldiers have no desire to go and live upon lands which are remote from civilization and usually below the economic level at the time.

2. The only way to get the soldiers all to claim their warrants is to make them assignable, and this causes the lands to pass into the hands of speculators and other classes of persons far different from those desired on the frontier.

3. It is best to let the soldiers select their lands anywhere in the public domain.

4. It is not feasible to set a limit as to time when warrants may be claimed or located. Some public land now spurned may later rise above the economic level and be taken up under warrants.

(Based principally on P. J. Treats, *National Land System 1785-1820*.)

EXHIBIT B—Land for Soldiers and Sailors in the British Dominions

1. *England and Wales*

In 1915 a Departmental Committee was appointed by the President of the Board of Agriculture and Fisheries to consider the settlement and employment on the land in England and Wales of discharged sailors and soldiers. The committee reported unanimously on the subject of "settlement" (Cd. 8182), but split on the subject of "employment."

Settlement.—The committee recommended that the County Councils be allowed to continue the work of providing small holdings to those who are bound by local ties, as had been done heretofore. The state, on the other hand, should provide small holdings to those willing to enter agricultural colonies. The state should have the power of compulsory purchase at the market price from private landowners. Each colony should be composed of at least 100 settlers, who should be trained and encouraged to engage in market gardening, fruit raising, and dairying. The settlers should not own their holdings, but should be state tenants, under a sufficient protection of their tenant rights. A discharged enlisted man should be given a holding only when he has demonstrated his ability to operate one to advantage. For this purpose a preliminary period of employment at a fair living wage in a central state-operated scientific farm was recommended. The state shall encourage the formation of coöperative credit associations among the settlers and extend credit to these associations. The state shall also organize depots and the marketing end in general, for which it shall charge a commission. This shall continue until that time when the settlers will be ready for coöperative marketing. The central farm shall employ a highly qualified director and staff to teach the settlers the methods of scientific farming. The ultimate goal shall be to make the colonies self-supporting, the state continuing to bear only the cost of the work of education. The committee recommended immediate propaganda work in the Army and Navy to attract settlers.

Employment.—Of the ten members of the committee seven signed a majority report and the remaining three united upon a minority report. Both reports are in agreement with reference to the necessity

of attracting labor to the farms after the war; but, while the majority report maintains that the requisite changes in English agriculture could not be effected in time to employ the ex-service men, the minority report insists that England must offer to the ex-service men as good a prospect in agriculture as do the dominions, and that she must do so without delay. The minority report advocates a policy of establishing minimum wages through district or national boards, and guaranteeing to the farmer a minimum price on wheat. That would enable him, first, to pay a higher wage and provide better living conditions; and, second, would induce him to convert the poorer grades of grass into arable land.

Memorandum on British Imperial plan for settlement of ex-service men upon land: Report of a committee appointed by the Secretary of State for the Colonies.—A Dominions' Royal Commission had previously reported that there should be set up a central authority for the Empire, which should be a Department of the Home Government for handling the matter of settlement. A Consultation Board on which the oversea dominions would be represented was to function in co-operation with the department. The present committee advocates giving the dominions not merely advisory, but fullfledged, representation, with the power to vote. The committee pointed out that plans for settlement at home and overseas are in no way mutually antagonistic. They say, however, that due care will have to be exercised in order not to disturb the labor situation in the oversea dominions should there be a large number of other than agricultural settlers emigrating. The matter of financing the settlers upon land is also considered.

2. Canada

A bill was introduced in the summer of 1917 in the House of Commons by the Minister of the Interior "To Assist Returned Soldiers in Settling Upon the Land and to Increase Agricultural Production." The bill proposes a Soldiers' Settlement Board to consist of three commissioners. The Minister of the Interior, at the request of the board, may reserve dominion lands for the purposes of the act, but all such reservations lapse three years after the close of the present war. The Ministry may grant to any settler recommended by the board a free entry for not more than 100 acres of such lands, subject to such conditions as in the opinion of the governor in council are necessary to secure the use of the land for the purposes for which it is granted. The board may loan a settler not more than \$2500 for the clearing of land for agricultural purposes, the improvement of agricultural land, the erection of farm buildings, the purchase of stock, machinery and equipment, and such purposes as the board may approve. Before making loans the board must be satisfied that the value of the security offered is sufficient to justify the loan, the value to be estimated on the basis of the agricultural productiveness of the land and the commercial value of any other security given; also that the applicant has the ability to make from the land a fair living for himself and his family, after paying the interest and amortization charges and other payments due. All loans must be expended under the su-

pervision of the board. Loans upon dominion lands constitute a first charge upon the lands, and loans upon other lands must be secured by first mortgages, the interest being 5 per cent in each case. Payments of principal and interest are to be made in equal annual installments extending over a period of not more than twenty years, but the settler may at any time pay the whole or any part of the money borrowed with interest. The board may defer the payment of the whole or part of the first two installments. In the case of dominion lands, patents are not to be issued until the loan and all interest due have been paid in full. The bill also provides that the board may with the approval of the governor in council make provision for the placing of returned soldiers with farmers in order that they may be instructed in farming, for agricultural training stations for returned soldiers, for farm instructors and inspectors to assist settlers with information and instructions in farming, as well as for training in domestic and household science for settlers' wives and female dependents.

3. *Australia*

A bill was introduced in the Australian senate in the summer of 1917 by the government under the name "Australian Soldiers' Repatriation Bill." It is a non-partisan measure and at the divisions on the second reading only a small minority voted against it—without, however, opposing the principle of the bill. In February, 1917, a conference was held between representatives of the commonwealth and of the states. It was agreed that the states should supply the returned soldiers and sailors with agricultural land and that the commonwealth should supply them with the necessary capital. A census was taken among the soldiers and sailors in camp both at home and abroad, and 40,000 expressed a desire to settle upon the land. It was recognized that there was not enough public land of a satisfactory grade to satisfy the demand; so that condemnation of private land would have to be resorted to. The government, at this time, is unprepared to discuss the financial side of the proposed projects, it being bent solely upon committing the commonwealth to a responsibility to the men who have enlisted. Senator Millen, vice president of the executive council in charge of the bill, thought that the cost involved would be about £60,000,000.

The underlying principles are as follows: (1) The holding should be of such a size that the settler's own labor is the most important factor in its development and working. (2) That the size and character of the holding shall correspond to the financial resources at the command of the settler. (3) That the knowledge necessary to work the holding can be acquired in a short period. (4) That the returns shall be quick. (5) That the government shall guarantee a market and organize the handling and the sale of the product. (6) That the government shall through experts in its employ offer scientific and practical guidance to settlers. (7) That the scheme should be administered jointly by the commonwealth and the states, plenty of scope being given to the unpaid work of honorary functionaries.

4. *New Zealand*

The New Zealand Discharged Soldiers Settlement Act, of 1915, provides for the disposal of lands to returned soldiers under two headings: Ordinary Tenures and Special Tenures. The governor sets apart by proclamation an area of crown or settlement land for selection by discharged soldiers only and such land is disposed of under the "ordinary tenure" of the previous land acts. A duly authorized agent of an enlisted man may apply on his behalf for land under this act. Thus able-bodied men or slightly wounded men may be provided for.

Under "special tenure" the disabled men are dealt with. The government finds the land and finances the wounded soldiers until such time as they can reasonably obtain a return from the land.

No transfer of land acquired in either way may be made for a period of ten years, except with the consent of the government.

G. F. WARREN.—Three important land problems are: What are our land resources? Who is to live on the land? and, How is the farmer to acquire land?

Our Land Resources

The tentative schedule for the next census shows the following classification of land in farms:

	<i>Acres</i>
9. Total number of acres in this farm. ¹ (Give here all lands operated or farmed by the farm operator, including all outlying or separate fields, meadows, pastures, or woodlands operated by him as owner, tenant, or manager. Do not include land pastured, cropped, or otherwise operated by any other than the one whose name is given after Inquiry 1.)	_____
10. Number of acres of land which is devoted to orchards or vineyards; or from which hay, corn, or other crops were harvested in 1917.	_____
11. Number of acres of tillable land which in its present condition can be plowed, but which was used exclusively for pasturage in 1917.	_____
12. Number of acres of tillable land which in 1917 was <i>lying idle</i> or fallow.	_____
13. Number of acres of land on which crops were sown or planted in 1917, but were not harvested on account of crop failure.	_____
14. Number of acres of woodland <i>used</i> for pasture in 1917.	_____
15. Number of acres of woodland <i>not used</i> for pasture in 1917.	_____
16. Number of acres of nontillable land, other than woodland, used for pasture in 1917.	_____
17. Acres of waste land and land covered by buildings, barn and house lots, roads, and lanes.	_____

¹ The sum of the acres reported in answer to Inquiries 10-17, inclusive, should be the same as the answer reported to Inquiry 9.

This will be the first enumeration of the uses made of all land in farms. The conference on the agricultural schedule called by the Bureau of the Census recommended that an enumeration of land not in farms be made by counties. Such an enumeration can be made with considerable accuracy in counties where there is a county agricultural agent. The writer suggests for consideration the following classification of land *not* in farms:

	<i>Acres</i>
1. Land occupied by cities, towns, and villages and their suburbs and not used for any agricultural purpose.	_____
2. Land occupied by cities, towns, and villages and their suburbs, but used for growing crops and not reported in farms.	_____
A good map of the county will enable one to estimate the total area in cities, towns, and villages. The total area is the sum of the two answers given above plus the area in such places that is included in farms.	
Estimate of the area in gardens and other agricultural use can be made by multiplying the average area used for such purposes by the number of families probably having such land.	
3. Areas of less than 3 acres outside of incorporated places used as homes but not reported as farms.	_____
4. Land used for industrial plants and not in cities, towns, or villages.	_____
5. Surface area occupied by oil, gas, and salt wells, and by mines.	_____
6. Land occupied by railroads.	_____
The miles of railroad may be measured on a map and multiplied by the average width of the right of way.	
7. Land in public parks.	_____
8. Land in fairgrounds.	_____
9. Land in graveyards.	_____
10. Land in school-grounds outside of incorporated places.	_____
11. Woodland not in farms that would be suitable for crop growing if cleared.	_____
12. Woodland not in farms that would be suitable for crop growing if cleared and drained.	_____
13. Woodland not in farms not suitable for crop growing, but suitable for pasture if cut.	_____
14. Woodland not in farms not feasible to cut or clear, but now used for range.	_____
15. Woodland not suitable for either crop growing or pasture.	_____
16. Swamps, ponds, or lakes not in farms suitable for crop growing if cleared and drained and which it is feasible to drain.	_____
17. Swamps, ponds, or lakes not in farms for which drainage is not feasible.	_____
18. Streams, canals, drainage and irrigation ditches.	_____
19. Arid land that is suitable for crop growing, and for which water is available.	_____

- | | |
|---|-------|
| 20. Arid land for which water is not available, but that is suitable for crop growing by dry-farming methods. | _____ |
| 21. Arid land suitable for grazing purposes but not included in 19 and 20. | _____ |
| 22. Arid land not suitable for any agricultural use. | _____ |
| 23. Mountainous land not suitable for any agricultural use. | _____ |
| 24. Rocky or stony land not included above and not suitable for any agricultural use. | _____ |
| 25. Sand hills not suitable for any agricultural use. | _____ |
| 26. Other land—describe it. | _____ |
| Total | _____ |
- The total area plus the area of land in farms should equal the area of the county. This is given in the Thirteenth Census.

This classification may appear to be in great detail, but it is just as easy to report most of these items separately as it is to have them combined.

Who is to Live on the Land?

Since farm families are more prolific than city families, there is a constant movement to cities. The kind of persons who live on the farms will soon be the kind in cities. The kind of persons who live on the land should be the kind that we desire as future population. Some very shortsighted persons would even add to our present race problem a Japanese and Chinese race problem by importing these persons to work on farms.

Means of Acquiring Land

The writer believes that public welfare is best served and the best farm conditions developed when it is possible for the average farm boy without any capital to accumulate enough money to become a tenant by working as a hired man for two to five years; and when it is possible for him to accumulate enough money so that he may become an owner of a mortgaged farm by five to ten years' work as a tenant.

An investigation made in 1911 in Jefferson County, New York, of 668 farms showed the methods of getting started as stated in the following table.

In this region 38 per cent of the farms were rented.

In Livingston County, New York, the average age at which operators became owners was thirty-six years. In this region 36 per cent of the farmers were tenants.

In Jefferson County those who started as hired men at home were

TIME REQUIRED TO BECOME TENANT OR OWNER 668 FARMS
IN JEFFERSON COUNTY, NEW YORK

How began	Now a farm owner			Now a tenant	
	Number	Age became tenant	Age became owner	Number	Age became tenant
Began as owner	18	...	23
Began at other than farm labor	33	...	30
Hired man.....	86	...	30
Other labor and hired man.....	46	...	35
Began as tenant	29	22	33	11	26
Other labor, then tenant...	38	28	36	28	31
Hired man and tenant	130	27	37	149	27
Other labor, hired man and tenant	38	33	42	62	33
Average and total	418		35	250	29
Livingston County			36		

one year older when they became owners than were those who started as hired men away from home, but those who stayed at home had acquired over \$1000 more capital at the same age.

Those who went to high school became owners at four years younger than did those who did not go to high school. Those who went to college became owners three years younger than did high school men. Of those who began as hired men away from home, the ones who went to high school became owners a year younger than did those who went to district school only. The high school men made larger labor incomes than did the district school men. When sorted in groups with equal capital at the beginning of the year, those who had been to high school made larger labor incomes than those who had not been to high school. The college men had largest families, high school next, and district school men had the smallest families.

C. F. MARBUT.—In this country we are beginning to realize the need of more accurate knowledge of the land. Our census data concern the total area and its condition with respect to use. We know with a considerable degree of accuracy the area of improved and that of unimproved land. This, however, tells us nothing directly about its character. We are able to draw certain inferences but they at best

are mere inferences.

There are in this country large areas of unimproved land. All of it is destined to become improved, but not in the existing meaning of that term. Virgin forest land is not improved at present, but it will in time be considered so; and much of the land now unimproved and some that is now said to be improved will find its most productive use as forest land. To determine what shall finally become forest land and what shall be devoted to other uses, accurate knowledge is essential if it be properly determined. Knowledge of the characteristics of the land, or, in other words, the information on which classification must be based, is needed not as an end but as a means of determining the capabilities of the land. The problem therefore is:

1. Utilization of unused land.
2. Better utilization of land now used.

The better utilization of land now used is the same problem as the effective use of unused land. The problem of the unused land is not simply use, but an intelligent use, or the best use, determined by neutral or fixed conditions and economic conditions which change more or less slowly.

The solution of the problem in both cases depends upon a knowledge of the natural or fixed conditions. Primarily they are of two kinds: (1) air or climatic conditions, and (2) land conditions which are fundamentally concerned with soil and topography. What I shall say will concern the soil itself, assuming that it is more fundamental and of much more importance than topography.

Many attempts have been made in the past and are still being made to determine the character of the land by some "short cut" method. Such attempts are in harmony with our methods in doing many things, even in getting rich. They express the attitude of youth everywhere. We have tried to interpret soil conditions from geological conditions. It has been more or less vociferously maintained by the geologists, and somewhat tacitly admitted by others, that the geology of a region will give us about all we desire to know concerning its soils. More careful study of the soil itself, however, whether the study be directed to the soil as a natural body worthy of investigation for itself alone regardless of its value as a producer of crops, or merely as a producer of wealth, has shown that over large areas of the earth's surface the nature of the soil is only remotely and in somewhat minor details dependent upon the geological formations as these are defined by geologists.

The geologist is able to account for the processes by which the soil material was accumulated and for the original character of that material when accumulated, but the existing soil differs from that material

to varying degrees, depending upon the activity of the forces that have been operating on the material since its accumulation and the time and conditions under which they have operated.

Soils derived from identical original material often differ much more than do other soils derived from widely different original material. It is no more possible to identify the broad essential characteristics of soils with geological formations than it is to classify architectural types on the basis of the kind of trees from which the wood for construction work came.

The botanist is still at work attempting to classify land on the basis of its vegetation and apparently has a more sound basis for his efforts than has the geologist. Since the native vegetation has disappeared from large parts of the earth's surface, and since it is well known that a given vegetation type at any time is dependent on many factors of which the soil is only one, it is evident that, while the vegetation may be used, if used with intelligence, for making a rough classification of the soil into broad groups, yet it has the fatal defect of resulting only in an approximation at best. It is a makeshift and indirect method of getting at the matter and has very definite limitations in the extent and detail to which it can be extended.

Land classification does not differ essentially in its requirements as to method from the classification of other natural bodies. The classification of plants has not been effected through a study of animals, even in their relation to plants. We do not classify rocks on the basis of information gained from the soils derived from them or on the nature of the magmas from which they solidified, or in the case of sedimentary rocks on the basis of the original rock that was decomposed to furnish the material of which they are composed. A real classification of the land can be made only on the basis of the characteristics of the land itself. It must be based on facts determined at first hand and not indirectly. Land classification reduced to its lowest, most fundamental terms is soil classification, since the characteristics of the soil are the final product of all the forces that have been operating on any given area of the earth's surface under all the conditions existing and that have existed in each locality. Soil must be classified according to the characteristics of the soils themselves—characteristics determined by direct study of the soil.

To classify soil as glacial soil or alluvial soil or pine-land soil or grass-land soil is of some value where no other data are available, but it tells us very little of the soil itself; while to classify it according to texture, color, profile, structure, chemical composition and reactions,

and physical characteristics is classifying it on the basis of its own characteristics; and each fact is a soil fact and is of value in a final and fundamental characterization of the soil.

It is exactly this that we are attempting to do in our soil survey work. While it is true that we have certain groups of soils in which the group basis refers to features that are not necessarily those of the soil to be observed by a study of the soil itself, yet this is merely for convenience and we recognize fully that such is the case. The soil units are defined according to characteristics of the soil itself. We realize that one result of our grouping according to physiography and geology brings about a certain amount of duplication in our units, yet this will be gradually eliminated in time when we have finally outlived the necessity of our convenient but artificial grouping.

Our work, therefore, consists of soil definition, identification and location, and the grouping of the soil units according to their characteristics. This is a classification of the fundamental features of the land. No final land classification is possible without this soil classification. It is the one factor that heretofore has been left out of consideration because it was not available. With a knowledge of the soil, topography, and climate we shall be in possession of the three fundamental factors that are necessary.

The climate is already rather well known. The topography also in general terms and the details are being accumulated. The soil data both general and detailed were the last of the three to claim recognition, but they are now in process of accumulation.

In our work the soil unit is defined in terms of its characteristics, many of which enter into its determination and must be determined before the soil can be identified. It is unnecessary to describe them here since they are more or less technical. By their means, however, the soils of any area that has been covered can be grouped according to several characteristics—for example: according to drainage, degree of oxidation and aeration, presence or absence of hardpan, texture, intractability, productiveness, chemical characteristics, physical features, topography.

Classification of the land, however, is not the final solution of the problem. It marks the attainment merely of the completion of the first and preliminary stage of its treatment. It expresses the result of the accumulation of the fundamental information on which the work of the next phase must be based. The latter consists of the determination of the adaptabilities and capacities of the several kinds of land that have been defined, identified, and located. This must be done

either by experiments carried on for the purpose on each kind of land, or by a determination and interpretation of the results of the unconscious experiments that farmers have made in their more or less blind efforts to adapt themselves to their natural environment. The work of each of these methods must be carried out by specialists and by those whose training fits them for that particular work. It is different from the work of land classification. The first must be done by the crop experimenter—the plat experiment work of the Experiment Stations. The second is the work of the expert in the geographic phases of agriculture. It is statistical in its fundamental nature and is done by the careful accumulation and the interpretation of agricultural statistics.

The final solution of the problem is effected by a farm management study, a study of farm economics, which will determine what shall be done under each combination of a particular soil or group of soils, a given climate, and a given set of economic conditions. For the present we in the Bureau of Soils are concerned with the accumulation of the necessary fundamental data concerning the soil.